IN-VITRO IRON BIOAVAILABILITY IN AMARANTH GRAIN-BASED COMPLEMENTARY FOODS PROCESSED WITH EDIBLE TERMITES AND EFFECTS OF GERMINATING AMARANTH GRAIN ON PHYTATE/MINERAL MOLAR RATIOS

John N. Kinyuru¹; Silvenus O. Konyole²; Glaston M. Kenji¹; Christine A. Onyango¹; Victor O. Owino⁴; Bethwell O. Owuor²; Benson B. Estambale²; Henrik Friis³; Nanna Roos³

¹Department of Food Science and Technology, Jomo Kenyatta University of Agriculture and Technology, Kenya; ²University of Nairobi Institute of Tropical and Infectious Diseases, Kenya; ³University of Copenhagen, Denmark; ⁴University of California-Davis, USA; ⁵Catholic University of Eastern Africa, Kenya

Low mineral bioavailability is regarded as one of the confounding factors responsible for low mineral absorption and utilisation as a result of dietary components. This study aims at investigating the effect of animal source foods on in-vitro iron availability when included as ingredients in three amaranth grain-based complementary foods. The effect of germinating *Amaranthus cruentus* grain on predicted mineral bioavailability was also evaluated. In-vitro iron availability was measured as Fe(II) dialysability/availability obtained by a method combining in vitro protein digestion and dialysis (IVPD-dialysis). Aliquots were collected following digestion with pepsin or pepsin+pancreatin and investigated for their effects on Fe(II) dialysability imitating the conditions in the duodenum and the proximal jejunum. Grains were steeped for 5 hours, germinated for 72 hours and phytic acid, iron, zinc and calcium analysed at intervals. Available minerals were predicted in germinated grains by using phytate/mineral molar ratio. The results showed high phytic acid levels as well as low Fe(II) availability in the foods (<5%). There was a significant increase in available Fe(II) with increase in edible insects’ content after pepsin+pancreatin digestion though the increase after pepsin digestion was not significant (p>0.05). Fe(II) availability between pepsin and pepsin+pancreatin digestion on all the foods was not different significantly (p>0.05). Phytate reduction on the grains was significant after 24 hours of germination followed by significant reduction of molar ratios (p>0.05). Edible insects may constitute a valuable animal source food component in enhancing mineral bioavailability though it has to be coupled with reduction of inhibitors.